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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XC238

Takes of Marine Mammals Incidental to Specified Activities; Marine Geophysical Survey on the Mid-Atlantic Ridge in the Atlantic Ocean, April 2013, through June 2013

AGENCY: National Marine Fisheries Service, National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental harassment authorization.

SUMMARY: In accordance with the Marine Mammal Protection Act (MMPA) regulation, we hereby give notification that we have issued an Incidental Harassment Authorization (Authorization) to Lamont-Doherty Earth Observatory (Observatory), a part of Columbia University, in collaboration with the National Science Foundation (Foundation), to take marine mammals, by harassment, incidental to conducting a marine geophysical (seismic) survey on the Mid-Atlantic Ridge in the north Atlantic Ocean in international waters, from April 2013 through June 2013.

DATES: Effective April 8, 2013, through June 24, 2013.

ADDRESSES: To obtain an electronic copy of the Authorization, write to P. Michael Payne, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910–3225 or download an electronic copy at:

<http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications>.

To obtain an electronic copy of (1) the application containing a list of the references within this document; and (2) the Foundation's draft environmental analysis titled, "Marine geophysical survey by the R/V Marcus G. Langseth on the mid-Atlantic Ridge, April–May 2013," for their federal action of funding the Observatory's seismic survey; or (3) our Environmental Assessment titled, "Issuance of an Incidental Harassment Authorization to Lamont-Doherty Earth Observatory to Take Marine Mammals by Harassment Incidental to a Marine Geophysical Survey in the Atlantic Ocean, April - June, 2013," and the Finding of No Significant Impact; write to the previously mentioned address, telephone the contact listed here (see FOR FURTHER INFORMATION CONTACT), or download the file at:

<http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications>.

The Service's Biological Opinion will be available online at:

<http://www.nmfs.noaa.gov/pr/consultation/opinions.htm>.

FOR FURTHER INFORMATION CONTACT: Jeannine Cody, National Marine Fisheries Service, Office of Protected Resources, (301) 427-8401.

#### SUPPLEMENTARY INFORMATION:

##### Background

Section 101(a)(5)(D) of the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 et seq.) directs the Secretary of Commerce to authorize, upon request, the incidental, but not intentional, taking of small numbers of marine mammals of a species or population stock, by United States citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if, after

notice of a proposed authorization to the public for review and public comment: (1) we make certain findings; and (2) the taking is limited to harassment.

We shall grant authorization for the incidental taking of small numbers of marine mammals if we find that the taking will have a negligible impact on the species or stock(s), and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant). The authorization must set forth the permissible methods of taking; other means of effecting the least practicable adverse impact on the species or stock and its habitat; and requirements pertaining to the mitigation, monitoring and reporting of such taking. We have defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Section 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the United States can apply for an authorization to incidentally take small numbers of marine mammals by harassment. Section 101(a)(5)(D) of the MMPA establishes a 45-day time limit for our review of an application followed by a 30-day public notice and comment period on any proposed authorizations for the incidental harassment of small numbers of marine mammals. Within 45 days of the close of the public comment period, we must either issue or deny the authorization and must publish a notice in the Federal Register within 30 days of our determination to issue or deny the authorization.

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to

injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or

(ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

#### Summary of Request

On December 7, 2012, we received an application from the Observatory requesting that we issue an Incidental Harassment Authorization (Authorization) for the take, by Level B harassment only, of small numbers of marine mammals incidental to conducting a marine seismic survey in the north Atlantic Ocean in international waters April through May 13, 2013. We received a revised application from the Observatory on December 23, 2012 and January 17, 2013, which reflected updates to the mitigation safety zones, incidental take requests for marine mammals, and information on marine protected areas. We determined the application complete and adequate on January 18, 2013 and released the application for public comment (see ADDRESSES) for consideration of issuing an Authorization to the Observatory.

The Observatory, with research funding from the Foundation, plans to conduct the seismic survey plans to conduct a two-dimensional (2-D) seismic survey on the Mid-Atlantic Ridge in the north Atlantic Ocean to image the Rainbow massif to determine the characteristics of the magma body that supplies heat to the Rainbow hydrothermal field; determine the distribution of the different rock types that form the Rainbow massif; document large- and small-scale faults in the vicinity and investigate their role in controlling hydrothermal fluid discharge. The Observatory plans to use one source vessel, the R/V Marcus G. Langseth (Langseth), a seismic airgun array, a single hydrophone

streamer, and ocean bottom seismometers (seismometers) to conduct the seismic survey. In addition to the operations of the seismic airgun array and hydrophone streamer, and the seismometers, the Observatory intends to operate a multibeam echosounder and a sub-bottom profiler continuously throughout the proposed survey.

Acoustic stimuli (i.e., increased underwater sound) generated during seismic operations, may have the potential to cause behavioral disturbance for marine mammals in the survey area. This is the principal means of marine mammal taking associated with these activities. We expect these disturbances to be temporary and result in a temporary modification in behavior and/or low-level physiological effects (Level B harassment only) of small numbers of certain species of marine mammals.

We do not expect that the movement of the Langseth, during the conduct of the seismic survey, has the potential to harass marine mammals because of the relatively slow operation speed of the vessel (4.6 knots (kts); 8.5 kilometers per hour (km/h); 5.3 miles per hour (mph)) during seismic acquisition.

We also do not expect that the operation of the echosounder, sub-bottom profiler, and ocean bottom seismometers have the potential to harass marine mammals because they would already experience affects from the airgun array. Whether or not the airguns are operating simultaneously with the other sources, we expect the marine mammals to exhibit no more than temporary and inconsequential responses to the echosounder, sub-bottom profiler, and ocean bottom seismometers given their characteristics (e.g., narrow, downward-directed beam).

Some minor deviation from the Observatory's requested dates of April through May 2013, is possible, depending on logistics, weather conditions, and the need to repeat some

lines if data quality is substandard. Therefore, we would issue an Authorization that is effective from April 8, 2013, to June 24, 2013.

We have outlined the purpose of the program in a previous notice for the proposed Authorization (78 FR 10137, February 13, 2013). The Observatory's proposed activities have not changed between the proposed Authorization notice and this final notice announcing the issuance of the Authorization. Refer to the to the notice of the proposed Authorization (78 FR 10137, February 13, 2013), the application, and the Foundation's environmental analysis for a more detailed description of the authorized action, including vessel and acoustic source specifications.

#### Description of the Specified Geographic Region

The Observatory would conduct the survey in international waters outside of the Azorean Exclusive Economic Zone. The study area would encompass an area on the Mid-Atlantic Ridge bounded by the following coordinates: approximately 35.5 to 36.5° North by 33.5 to 34.5° West.

#### Comments and Responses

We published a notice of receipt of the Observatory's application and proposed Authorization in the Federal Register on February 13, 2013 (78 FR 10137). During the 30-day public comment period, we received comments from the Marine Mammal Commission (Commission) and one private citizen. These comments are online at: <http://www.nmfs.noaa.gov/pr/permits/incidental.htm>. Following are the comments and our responses.

Comment 1: One private citizen requested that we deny the Observatory's Authorization application because they believed that the activity would kill marine mammals in the survey area.

Response: As described in detail in the Federal Register notice for the proposed Authorization (78 FR 10137, February 13, 2013), as well as in this document, we do not believe that the Observatory's seismic surveys would cause injury or mortality to marine mammals. The required monitoring and mitigation measures that the Observatory would implement during the survey would further reduce the adverse effect on marine mammals to the lowest levels practicable. Therefore, we do not anticipate that any injuries, serious injuries, or mortalities would occur as a result of the Observatory's planned marine seismic surveys, and we do not propose to authorize injury, serious injury or mortality for this survey. We anticipate only behavioral disturbance to occur during the conduct of the survey activities.

Comment 2: The Commission recommends that, before issuing the requested Authorization, we require the Observatory to: (1) re-estimate the proposed exclusion zones and buffer zones and associated number of marine mammal takes using operational and site-specific environmental parameters, using simple ratios to adjust for tow depth, and, applying a correction factor of 1.5 to estimate sound propagation in intermediate water depths; and (2) if the Observatory does not re-estimate the zones, provide a detailed justification for basing the proposed survey's zones on modeling that relies on measurements from the Gulf of Mexico instead of the Atlantic Ocean.

Response: With respect to the Commission's first point, based upon the best available information and our analysis of the likely effects of the specified activity on marine

mammals and their habitat, we are satisfied that the data supplied by the Observatory and the information that we evaluated in the proposal including the referenced documents comprise the best available information on the likely effects of the activities on marine mammals are sufficient to inform our analysis and determinations under the MMPA, ESA of 1973 (16 U.S.C. 1531 et seq.), and the National Environmental Policy Act (NEPA). The identified zones are appropriate for the survey. Thus, for this survey, we will not require the Observatory to re-estimate the proposed exclusion zones and buffer zones and associated number of marine mammal takes using operational and site-specific environmental parameters.

With respect to the Commission's second point, the Observatory has predicted received sound levels in the action area using their acoustic model (Diebold et al., 2010) as a function of distance from the airguns for the 36-airgun array and for a single 1900LL 40-cubic inch (in<sup>3</sup>) airgun. This modeling approach uses ray tracing for the direct wave traveling from the array to the receiver and its associated source ghost (reflection at the air-water interface in the vicinity of the array), in a constant-velocity half space (infinite homogeneous ocean layer, unbounded by a seafloor). The Observatory's application and the Foundation's environmental analysis includes detailed information on the study, and their modeling process of the calibration experiment in shallow, intermediate, and deep water. Additionally, the conclusions in Appendix H of the "2011 Programmatic Environmental Impact Statement/Overseas Environmental Impact Statement for Marine Seismic Research Funded by the National Science Foundation or Conducted by the U.S. Geological Survey" (2011 PEIS) also show that the Observatory's model represents the actual produced sound levels, particularly within the first few

kilometers, where the predicted zone (i.e., exclusion zone) lie. At greater distances, local oceanographic variations begin to take effect, and the Observatory's model tends to over predict.

Because the modeling matches the observed measurement data, the authors concluded that those using the models to predict zones can continue to do so, including predicting exclusion zones around the vessel for various tow depths. At present, the Observatory's model does not account for site-specific environmental conditions and the calibration study analysis of the model predicted that using site-specific information may actually estimate less conservative exclusion zones at greater distances.

While it is difficult to estimate exposures of marine mammals to acoustic stimuli, we are confident that the Observatory's approach to quantifying the exclusion and buffer zones uses the best available scientific information (as required by our regulations) and estimation methodologies. After considering this comment and evaluating the respective approaches for establishing exclusion and buffer zones, we have determined that the Observatory's approach and corresponding monitoring and mitigation measures will effect the least practicable impact on the affected marine mammal species or stocks.

Comment 3: The Commission recommends that, before issuing the requested Authorization, we use species-specific maximum densities (i.e., estimated by multiplying the existing density estimates by a precautionary correction factor) to account for uncertainty and then re-estimate the anticipated number of takes.

Response: For purposes of this Authorization, the Observatory used the cetacean densities based on densities calculated from sightings, effort, mean group sizes, and values for  $f(0)$  in Waring et al. (2008), which extends from the Azores at approximately

38° N to approximately 53° N. The Observatory's use of these peer-reviewed density estimates are the best available information to estimate density for the survey area and to estimate the number of authorized takes for the seismic survey on the Mid-Atlantic Ridge in the Atlantic Ocean. The results of the associated monitoring reports show that our past use of best estimates in international waters was appropriate and has not refuted our past determinations.

Comment 4: The Commission recommends that we prohibit an eight-minute pause following the sighting of a marine mammal in the exclusion zone and extend that pause to cover the maximum dive times of the species likely to be encountered prior to resuming airgun operations after both power-down and shut-down procedures.

Response: The Authorization specifies the conditions under which the Langseth will resume full-power operations of the airguns after a power-down or shut-down. During periods of active seismic operations, there are occasions when the airguns need to be temporarily shut-down (e.g., due to equipment failure, maintenance, or shut-down) or when a power-down is necessary (e.g., when a marine mammal is seen entering or about to enter the exclusion zone).

Following a shutdown, if the observer has visually confirmed that the animal has departed the 180-dB exclusion zone within a period of less than or equal to eight minutes after the shutdown, then the Langseth may resume airgun operations at full power. Else, if the observer has not seen the animal depart the 180-dB exclusion zone, the Langseth shall not resume airgun activity until 15 minutes after the last sighting has passed for species with shorter dive times (i.e., small odontocetes and pinnipeds) or 30 minutes after the last sighting has passed for species with longer dive durations (i.e., mysticetes and

large odontocetes, including sperm, pygmy sperm, dwarf sperm, killer, and beaked whales). The Langseth may then initiate the 30-minute ramp-up. However, ramp-up will not occur as long as a marine mammal is detected within the exclusion zone, which provides more time for animals to leave the exclusion zone, and accounts for the position, swim speed, and heading of marine mammals within the exclusion zone.

We, the Observatory, and the Foundation believe that the eight-minute period in question is an appropriate minimum amount of time to pass after which a ramp-up process should be followed. In these instances, should it be possible for the Observatory to reactivate the airguns without exceeding the eight-minute period (e.g., equipment is fixed or a marine mammal is visually observed to have left the exclusion zone for the full source level), then the Observatory would reactivate the airguns to the full operating source level identified for the survey (in this case 6,600 in<sup>3</sup>) without need for initiating ramp-up procedures.

We recognize that several species of deep-diving cetaceans are capable of remaining underwater for more than 30 minutes (e.g., sperm whales and several species of beaked whales); however, for the following reasons we believe that 30 minutes is an adequate length for the monitoring period prior to the ramp-up of airguns:

(1) Because the Langseth is required to monitor before ramp-up of the airgun array, the time of monitoring prior to the start-up of any but the smallest array is effectively longer than 30 minutes (ramp-up will begin with the smallest airgun in the array and airguns will be added in sequence such that the source level of the array will increase in steps not exceeding approximately 6 dB per five minute period over a total duration of about 30 minutes);

(2) In many cases Protected Species Observers are observing during times when the Observatory is not operating the seismic airguns and would observe the area prior to the 30-minute observation period;

(3) The majority of the species that may be exposed do not stay underwater more than 30 minutes; and

(4) All else being equal and if deep-diving individuals happened to be in the area in the short time immediately prior to the pre-ramp-up monitoring, if an animal's maximum underwater dive time is 45 minutes, then there is only a one in three chance that the last random surfacing would occur prior to the beginning of the required 30-minute monitoring period and that the animal would not be seen during that 30-minute period.

(5) Finally, seismic vessels are moving continuously (because of the long, towed array and streamer) and we believe that unless the animal submerges and follows at the speed of the vessel (highly unlikely, especially when considering that a significant part of their movement is vertical [deep-diving]), the vessel will be far beyond the length of the exclusion zone within 30 minutes, and therefore it will be safe to start the airguns again.

Under the MMPA, incidental take authorizations must include means of effecting the least practicable impact on marine mammal species and their habitat. Monitoring and mitigation measures are designed to comply with this requirement. The effectiveness of monitoring is science-based, and monitoring and mitigation measures must be “practicable.” We believe that the framework for visual monitoring will: (1) be effective at spotting almost all species for which take is requested; and (2) that imposing additional requirements, such as those suggested by the Commission, would not meaningfully increase the effectiveness of observing marine mammals approaching or entering

exclusion zones and thus further minimize the potential for take.

Comment 5: The Commission recommends that we provide additional justification for our preliminary determination that the proposed monitoring program will be sufficient to detect, with a high level of confidence, all marine mammals within or entering the identified exclusion and buffer zones – such justification should (1) identify those species that it believes can be detected with a high degree of confidence using visual monitoring only under the expected environmental conditions, (2) describe detection probability as a function of distance from the vessel, (3) describe changes in detection probability under various sea state and weather conditions and light levels, and (4) explain how close to the vessel marine mammals must be for observers to achieve high nighttime detection rates.

Response: We believe that the planned monitoring program would be sufficient to detect (using visual monitoring and passive acoustic monitoring), with reasonable certainty, marine mammals within or entering the identified exclusion zones. This monitoring, along with the required mitigation measures, would result in the least practicable impact on the affected species or stocks and would result in a negligible impact on the affected species or stocks of marine mammals. Also, we expect some animals to avoid areas around the airgun array ensounded at the level of the exclusion zone.

We acknowledge that the detection probability for certain species of marine mammals varies depending on the animal's size and behavior, as well as sea state, weather conditions, and light levels. The detectability of marine mammals likely decreases in low light (i.e., darkness), higher Beaufort sea states and wind conditions, and poor weather (e.g., fog and/or rain). However, at present, we view the combination of visual

monitoring and passive acoustic monitoring as the most effective monitoring and mitigation techniques available for detecting marine mammals within or entering the exclusion zone. The final monitoring and mitigation measures are the most effective and feasible measures, and we are not aware of any additional measures which could meaningfully increase the likelihood of detecting marine mammals in and around the exclusion zone. Further, public comment has not revealed any additional monitoring and mitigation measures that could be feasibly implemented to increase the effectiveness of detection.

The Foundation and Observatory are receptive to incorporating proven technologies and techniques to enhance the current monitoring and mitigation program. Until proven technological advances are made nighttime mitigation measures during operations include combinations of the use of Protected Species Visual Observers for ramp-ups, passive acoustic monitoring, night vision devices provided to Protected Species Visual Observers, and continuous shooting of a mitigation airgun. Should the airgun array be powered-down the operation of a single airgun would continue to serve as a sound deterrent to marine mammals. In the event of a complete shut-down of the airgun array at night for mitigation or repairs, the Observatory suspends the data collection until 30 minutes after nautical twilight-dawn (when Protected Species Visual Observers are able to clear the exclusion zone). The Observatory will not activate the airguns until the entire exclusion zone is visible and free of marine mammals for at least 30 minutes.

In cooperation with us, the Observatory will be conducting efficacy experiments of night vision devices during a future Langseth cruise. In addition, in response to a recommendation from us, the Observatory is evaluating the use of forward-looking

thermal imaging cameras to supplement nighttime monitoring and mitigation practices. During other low-power seismic and seafloor mapping surveys throughout the world, the Observatory successfully used these devices while conducting nighttime seismic operations.

Comment 6: The Commission recommends that we consult with the funding agency (i.e., the Foundation) and individual applicants (i.e., the Observatory and U.S. Geological Survey) to develop, validate, and implement a monitoring program that provides a scientifically sound, reasonably accurate assessment of the types of marine mammal taking and the number of marine mammals taken.

Response: There will be periods of transit time during the cruise, and Protected Species Observers will be on watch prior to and after the seismic portions of the surveys, in addition to during the surveys. The collection of this visual observational data by Protected Species Observers may contribute to baseline data on marine mammals (presence/absence) and provide some generalized support for estimated take numbers, but it is unlikely that the information gathered from these cruises alone would result in any statistically robust conclusions for any particular species because of the small number of animals typically observed.

We acknowledge the Commission's recommendations and are open to further coordination with the Commission, Foundation (the vessel owner), and the Observatory (the ship operator on behalf of the Foundation), to develop, validate, and implement a monitoring program that will provide or contribute towards a more scientifically sound and reasonably accurate assessment of the types of marine mammal taking and the number of marine mammals taken.

Comment 7: The Commission recommends that we require the Observatory to: (1) report the number of marine mammals that were detected acoustically and for which a power-down or shut-down of the airguns was initiated; (2) specify if such animals also were detected visually; (3) compare the results from the two monitoring methods (visual versus acoustic) to help identify their respective strengths and weaknesses; and (4) use that information to improve mitigation and monitoring methods.

Response: The Authorization requires that Protected Species Acoustic Observers on the Langseth do and record the following when a marine mammal is detected by passive acoustic monitoring:

(i) Notify the on-duty Protected Species Visual Observer(s) immediately of a vocalizing marine mammal so a power-down or shut-down can be initiated, if required:

(ii) Enter the information regarding the vocalization into a database. The data to be entered include an acoustic encounter identification number, whether it was linked with a visual sighting, data, time when first and last heard and whenever any additional information was recorded, position, and water depth when first detected, bearing if determinable, species or species group (e.g., unidentified dolphin, sperm whale), types and nature of sounds heard (e.g., clicks, continuous, sporadic, whistles, creaks, burst pulses, strength of signal, etc.), and any other notable information.

We acknowledge the Commission's request for a comparison between the Observatory's visual and acoustic monitoring programs, and we will work with the Foundation (the vessel owner) and the Observatory (the ship operator on behalf of the Foundation) to analyze the results of the two monitoring methods to help identify their respective strengths and weaknesses. The results of our analyses may provide information

to improve mitigation and monitoring for future seismic surveys.

The Observatory reports on the number of acoustic detections made by the passive acoustic monitoring system within the post-cruise monitoring reports as required by the Incidental Harassment Authorization. The report also includes a description of any acoustic detections that were concurrent with visual sightings, which allows for a comparison of acoustic and visual detection methods for each cruise. The post-cruise monitoring reports also include the following information: total operations effort in daylight (hours), total operation effort at night (hours), total number of hours of visual observations conducted, total number of sightings, and total number of hours of acoustic detections conducted.

Post-cruise monitoring reports produced by the Observatory are currently available on our MMPA Incidental Take Program website at:

<http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications> should there be interest in further analysis of this data by the public.

Comment 8: The Commission recommends that we work with the Foundation to analyze those data collected during ramp-up procedures to help determine the effectiveness of those procedures as a mitigation measure for seismic surveys.

Response: We acknowledge the Commission's request for an analysis of ramp-ups and will work with the Foundation and the Observatory to help identify the effectiveness of the mitigation measure for seismic surveys. The Incidental Harassment Authorization requires that Protected Species Observers on the Langseth make observations for 30 minutes prior to ramp-up, during all ramp-ups, and during all daytime seismic operations and record the following information when a marine mammal is sighted:

(i) Species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from the seismic vessel, sighting cue, apparent reaction of the airguns or vessel (e.g., none, avoidance, approach, paralleling, etc., and including responses to ramp-up), and behavioral pace; and

(ii) Time, location, heading, speed, activity of the vessel (including number of airguns operating and whether in state of ramp-up or shut-down), Beaufort wind force and sea state, visibility, and sun glare.

One of the primary purposes of monitoring is to result in “increased knowledge of the species” and the effectiveness of required monitoring and mitigation measures. The effectiveness of ramp-up as a mitigation measure and marine mammal reaction to ramp-up would be useful information in this regard. We require the Foundation and the Observatory to gather all data that could potentially provide information regarding the effectiveness of ramp-up as a mitigation measure in its monitoring report. However, considering the low numbers of marine mammal sightings and low number of ramp-ups, it is unlikely that the information will result in any statistically robust conclusions for this particular seismic survey. Over the long term, these requirements may provide information regarding the effectiveness of ramp-up as a mitigation measure, provided Protected Species Observers detect animals during ramp-up.

#### Description of the Marine Mammals in the Area of the Specified Activity

Twenty-eight marine mammal species under our jurisdiction may occur in the proposed survey area, including seven mysticetes (baleen whales), and 21 odontocetes (toothed cetaceans) during April through June, 2013. Six of these species are listed as

endangered under the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 et seq.), including: the blue (Balaenoptera musculus), fin (Balaenoptera physalus), humpback (Megaptera novaeangliae), north Atlantic right (Eubalaena glacialis), sei (Balaenoptera borealis), and sperm (Physeter macrocephalus) whales.

Based on the best available data, the Observatory does not expect to encounter the following species because of these species rare and/or extralimital occurrence in the survey area. They include the: Atlantic white-sided dolphin (Lagenorhynchus acutus), white-beaked dolphin (Lagenorhynchus albirostris), harbor porpoise (Phocoena phocoena), Clymene dolphin (Stenella clymene), Fraser's dolphin (Lagenodelphis hosei), spinner dolphin (Stenella longirostris), melon-headed whale (Peponocephala electra), Atlantic humpback dolphin (Souza teuszii), long-beaked common dolphin (Delphinus capensis), and any pinniped species. Accordingly, we did not consider these species in greater detail and the Authorization would only address requested take authorizations for the 28 species.

Of these 28 species, the most common marine mammals in the survey area would be the: short-beaked common dolphin (Delphinus delphis), striped dolphin (Stenella coeruleoalba), and short-finned pilot whale (Globicephala macrorhynchus). We have presented a more detailed discussion of the status of these stocks and their occurrence in the central Pacific Ocean in Federal Register notice for the proposed Authorization (78 FR 10137, February 13, 2013).

#### Potential Effects on Marine Mammals

Acoustic stimuli generated by the operation of the airguns, which introduce sound into the marine environment, may have the potential to cause Level B harassment of

marine mammals in the proposed survey area. The effects of sounds from airgun operations might include one or more of the following: tolerance, masking of natural sounds, behavioral disturbance, temporary or permanent impairment, or non-auditory physical or physiological effects (Richardson et al., 1995; Gordon et al., 2004; Nowacek et al., 2007; Southall et al., 2007).

Permanent hearing impairment, in the unlikely event that it occurred, would constitute injury, but temporary threshold shift is not an injury (Southall et al., 2007). Although we cannot exclude the possibility entirely, it is unlikely that the proposed project would result in any cases of temporary or permanent hearing impairment, or any significant non-auditory physical or physiological effects. Based on the available data and studies described here, we expect some behavioral disturbance, but we expect the disturbance to be localized.

The notice for the proposed Authorization (78 FR 10137, February 13, 2013) included a discussion of the effects of sounds from airguns on mysticetes and odontocetes including tolerance, masking, behavioral disturbance, hearing impairment, and other non-auditory physical effects. We also refer the reader to the Observatory's application and the Foundation's environmental analysis for additional information on the behavioral reactions (or lack thereof) by all types of marine mammals to seismic vessels. We have reviewed these data and determined them to be the best available scientific information for the purposes of the Authorization. In general, we expect that the masking effects of seismic pulses would be minor, given the normally intermittent nature of seismic pulses.

Anticipated Effects on Marine Mammal Habitat

We included a detailed discussion of the potential effects of this action on marine mammal habitat, including physiological and behavioral effects on marine fish and invertebrates in the notice of the proposed Authorization (78 FR 10137, February 13, 2013) and our Environmental Assessment titled, “Issuance of an Incidental Harassment Authorization to Lamont-Doherty Earth Observatory to Take Marine Mammals by Harassment Incidental to a Marine Geophysical Survey in the Atlantic Ocean, April - June, 2013.”

While we anticipate that the specified activity may result in marine mammals avoiding certain areas due to temporary ensonification, this impact to habitat is temporary and reversible. We considered these impacts in detail in the notice of the proposed Authorization (78 FR 10137, February 13, 2013) as behavioral modification. The main impact associated with the activity would be temporarily elevated noise levels and the associated direct effects on marine mammals.

#### Mitigation

In order to issue an incidental take authorization under section 101(a)(5)(D) of the MMPA, we must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and the availability of such species or stock for taking for certain subsistence uses.

The Observatory has reviewed the following source documents and have incorporated a suite of proposed mitigation measures into their project description.

(1) Protocols used during previous Foundation and Observatory-funded seismic research cruises as approved by us and detailed in the Foundation's 2011 PEIS;

(2) Previous incidental harassment authorizations applications and authorizations that we have approved and authorized; and

(3) Recommended best practices in Richardson et al. (1995), Pierson et al. (1998), and Weir and Dolman, (2007).

To reduce the potential for disturbance from acoustic stimuli associated with the activities, the Observatory, and/or its designees have proposed to implement the following mitigation measures for marine mammals:

(1) Vessel-based visual mitigation monitoring;

(2) Proposed exclusion zones;

(3) Power down procedures;

(4) Shutdown procedures;

(5) Ramp-up procedures; and

(6) Speed and course alterations.

#### Vessel-based Visual Mitigation Monitoring

The Observatory would position observers aboard the seismic source vessel to watch for marine mammals near the vessel during daytime airgun operations and during any start-ups at night. Observers would also watch for marine mammals near the seismic vessel for at least 30 minutes prior to the start of airgun operations after an extended shutdown (i.e., greater than approximately eight minutes for this proposed cruise). When feasible, the observers would conduct observations during daytime periods when the seismic system is not operating for comparison of sighting rates and behavior with and

without airgun operations and between acquisition periods. Based on the observations, the Langseth would power down or shutdown the airguns when marine mammals are observed within or about to enter a designated 180-dB exclusion zone.

During seismic operations, at least four protected species observers would be aboard the Langseth. The Observatory would appoint the observers with our concurrence and they would conduct observations during ongoing daytime operations and nighttime ramp-ups of the airgun array. During the majority of seismic operations, two observers would be on duty from the observation tower to monitor marine mammals near the seismic vessel. Using two observers would increase the effectiveness of detecting animals near the source vessel. However, during mealtimes and bathroom breaks, it is sometimes difficult to have two observers on effort, but at least one observer would be on watch during bathroom breaks and mealtimes. Observers would be on duty in shifts of no longer than four hours in duration.

Two observers on the Langseth would also be on visual watch during all nighttime ramp-ups of the seismic airguns. A third observer would monitor the passive acoustic monitoring equipment 24 hours a day to detect vocalizing marine mammals present in the action area. In summary, a typical daytime cruise would have scheduled two observers (visual) on duty from the observation tower, and an observer (acoustic) on the passive acoustic monitoring system. Before the start of the seismic survey, the Observatory would instruct the vessel's crew to assist in detecting marine mammals and implementing mitigation requirements.

The Langseth is a suitable platform for marine mammal observations. When stationed on the observation platform, the eye level would be approximately 21.5 m (70.5 ft) above

sea level, and the observer would have a good view around the entire vessel. During daytime, the observers would scan the area around the vessel systematically with reticle binoculars (e.g., 7 x 50 Fujinon), Big-eye binoculars (25 x 150), and with the naked eye. During darkness, night vision devices would be available (ITT F500 Series Generation 3 binocular-image intensifier or equivalent), when required. Laser range-finding binoculars (Leica LRF 1200 laser rangefinder or equivalent) would be available to assist with distance estimation. Those are useful in training observers to estimate distances visually, but are generally not useful in measuring distances to animals directly; that is done primarily with the reticles in the binoculars.

When the observers see marine mammals within or about to enter the designated exclusion zone, the Langseth would immediately power down or shutdown the airguns. The observer(s) would continue to maintain watch to determine when the animal(s) are outside the exclusion zone by visual confirmation. Airgun operations would not resume until the observer has confirmed that the animal has left the zone, or if not observed after 15 minutes for species with shorter dive durations (small odontocetes and pinnipeds) or 30 minutes for species with longer dive durations (mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, killer, and beaked whales).

Proposed Exclusion Zones– The Observatory would use safety radii to designate exclusion zones and to estimate take for marine mammals. Table 1 shows the distances at which one would expect to receive three sound levels (160- and 180-dB) from the 36-airgun array and a single airgun. The 180-dB level shutdown criteria are applicable to cetaceans as specified by us (2000). The Observatory used these levels to establish the exclusion zones.

**Table 1** Modeled distances to which sound levels greater than or equal to 160 and 180 dB re: 1  $\mu$ Pa could be received during the proposed survey over the Mid-Atlantic Ridge in the north Atlantic Ocean, during April through June, 2013.

Source and Volume (in <sup>3</sup> )	Tow Depth (m)	Water Depth (m)	Predicted RMS Distances <sup>1</sup> (m)	
			160 dB	180 dB
Single Bolt airgun (40 in <sup>3</sup> )	12	> 1,000 100 to 1,000	388 582	100 100
36-Airgun Array (6,600 in <sup>3</sup> )	12	> 1,000 100 to 1,000	6,908 10,362	1,116 1,674

<sup>1</sup> Diebold, J.B., M. Tolstoy, L. Doermann, S.L. Nooner, S.C. Webb, and T.J. Crone. 2010. R/V Marcus G. Langseth seismic source: Modeling and calibration. *Geochem. Geophys. Geosyst.*

If the protected species visual observer detects marine mammal(s) within or about to enter the appropriate exclusion zone, the Langseth crew would immediately power down the airgun array, or perform a shutdown if necessary (see Shut-down Procedures).

Power Down Procedures—A power down involves decreasing the number of airguns in use such that the radius of the 180-dB zone is smaller to the extent that marine mammals are no longer within or about to enter the exclusion zone. A power down of the airgun array can also occur when the vessel is moving from one seismic line to another. During a power down for mitigation, the Langseth would operate one airgun (40 in<sup>3</sup>). The continued operation of one airgun is intended to alert marine mammals to the presence of the seismic vessel in the area. A shutdown occurs when the Langseth suspends all airgun activity.

If the observer detects a marine mammal outside the exclusion zone and the animal is likely to enter the zone, the crew would power down the airguns to reduce the size of the 180-dB exclusion zone before the animal enters that zone. Likewise, if a mammal is already within the zone when first detected, the crew would power-down the airguns immediately. During a power down of the airgun array, the crew would operate a single

40-in<sup>3</sup> airgun which has a smaller exclusion zone. If the observer detects a marine mammal within or near the smaller exclusion zone around the airgun (Table 1), the crew would shut down the single airgun (see next section).

**Resuming Airgun Operations After a Power Down** - Following a power-down, the Langseth crew would not resume full airgun activity until the marine mammal has cleared the 180-dB exclusion zone (see Table 1). The observers would consider the animal to have cleared the exclusion zone if:

- The observer has visually observed the animal leave the exclusion zone; or
- An observer has not sighted the animal within the exclusion zone for 15 minutes for species with shorter dive durations (i.e., small odontocetes or pinnipeds), or 30 minutes for species with longer dive durations (i.e., mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, and beaked whales); or

The Langseth crew would resume operating the airguns at full power after 15 minutes of sighting any species with short dive durations (i.e., small odontocetes or pinnipeds). Likewise, the crew would resume airgun operations at full power after 30 minutes of sighting any species with longer dive durations (i.e., mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, and beaked whales).

The Langseth's observers are continually monitoring the exclusion zone for the full source level while the mitigation airgun is firing. On average, observers can observe to the horizon (10 km; 6.2 mi) from the height of the Langseth's observation deck and should be able to say with a reasonable degree of confidence whether a marine mammal would be encountered within this distance before resuming airgun operations at full power.

Shutdown Procedures – The Langseth crew would shutdown the operating airgun(s) if a marine mammal is seen within or approaching the exclusion zone for the single airgun. The crew would implement a shutdown:

(1) If an animal enters the exclusion zone of the single airgun after the crew has initiated a power down; or

(2) If an animal is initially seen within the exclusion zone of the single airgun when more than one airgun (typically the full airgun array) is operating.

Considering the conservation status for north Pacific right whales, the Langseth crew would shutdown the airgun(s) immediately in the unlikely event that this species is observed, regardless of the distance from the vessel. The Langseth would only begin ramp-up would only if the north Pacific right whale has not been seen for 30 minutes.

Resuming Airgun Operations After a Shutdown - Following a shutdown in excess of eight minutes, the Langseth crew would initiate a ramp-up with the smallest airgun in the array (40-in<sup>3</sup>). The crew would turn on additional airguns in a sequence such that the source level of the array would increase in steps not exceeding 6 dB per five-minute period over a total duration of approximately 30 minutes. During ramp-up, the observers would monitor the exclusion zone, and if he/she sights a marine mammal, the Langseth crew would implement a power down or shutdown as though the full airgun array were operational.

During periods of active seismic operations, there are occasions when the Langseth crew would need to temporarily shut down the airguns due to equipment failure or for maintenance. In this case, if the airguns are inactive longer than eight minutes, the crew would follow ramp-up procedures for a shutdown described earlier and the observers

would monitor the full exclusion zone and would implement a power down or shutdown if necessary.

If the full exclusion zone is not visible to the observer for at least 30 minutes prior to the start of operations in either daylight or nighttime, the Langseth crew would not commence ramp-up unless at least one airgun (40-in<sup>3</sup> or similar) has been operating during the interruption of seismic survey operations. Given these provisions, it is likely that the vessel's crew would not ramp up the airgun array from a complete shutdown at night or in thick fog, because the outer part of the zone for that array would not be visible during those conditions.

If one airgun has operated during a power down period, ramp-up to full power would be permissible at night or in poor visibility, on the assumption that marine mammals would be alerted to the approaching seismic vessel by the sounds from the single airgun and could move away. The vessel's crew would not initiate a ramp-up of the airguns if a marine mammal is sighted within or near the applicable exclusion zones during the day or close to the vessel at night.

Ramp-up Procedures – Ramp-up of an airgun array provides a gradual increase in sound levels, and involves a step-wise increase in the number and total volume of airguns firing until the full volume of the airgun array is achieved. The purpose of a ramp-up is to “warn” marine mammals in the vicinity of the airguns, and to provide the time for them to leave the area and thus avoid any potential injury or impairment of their hearing abilities.

Ramp-up would begin with the smallest airgun in the array (40 in<sup>3</sup>). The crew would add airguns in a sequence such that the source level of the array would increase in steps

not exceeding six dB per five-minute period over a total duration of approximately 30 to 35 minutes. During ramp-up, the observers would monitor the exclusion zone, and if marine mammals are sighted, the Observatory would implement a power-down or shut-down as though the full airgun array were operational.

If the complete exclusion zone has not been visible for at least 30 minutes prior to the start of operations in either daylight or nighttime, the Observatory would not commence the ramp-up unless at least one airgun (40 in<sup>3</sup> or similar) has been operating during the interruption of seismic survey operations. Given these provisions, it is likely that the crew would not ramp up the airgun array from a complete shut-down at night or in thick fog, because the outer part of the exclusion zone for that array would not be visible during those conditions. If one airgun has operated during a power-down period, ramp-up to full power would be permissible at night or in poor visibility, on the assumption that marine mammals would be alerted to the approaching seismic vessel by the sounds from the single airgun and could move away. The Observatory would not initiate a ramp-up of the airguns if a marine mammal is sighted within or near the applicable exclusion zones.

#### Speed and Course Alterations

If during seismic data collection, the Observatory detects marine mammals outside the exclusion zone and, based on the animal's position and direction of travel, is likely to enter the exclusion zone, the Langseth would change speed and/or direction if this does not compromise operational safety. Due to the limited maneuverability of the primary survey vessel, altering speed and/or course can result in an extended period of time to realign onto the transect. However, if the animal(s) appear likely to enter the exclusion

zone, the Langseth would undertake further mitigation actions, including a power down or shut down of the airguns.

We have carefully evaluated the Authorization's mandatory mitigation measures and have considered a range of other measures in the context of ensuring that we have prescribed the means of effecting the least practicable adverse impact on the affected marine mammal species and stocks and their habitat. Our evaluation of measures included consideration of the following factors in relation to one another:

- (1) The manner in which, and the degree to which, we expect that the successful implementation of the measure would minimize adverse impacts to marine mammals;
- (2) The proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and
- (3) The practicability of the measure for applicant implementation.

Based on our evaluation of the measures, as well as other measures considered by us or recommended by the public for previous low-energy seismic surveys, we have determined that the mitigation measures provide the means of effecting the least practicable adverse impacts on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

#### Monitoring and Reporting

In order to issue an incidental take authorization for an activity, section 101(a)(5)(D) of the MMPA states that we must set forth "requirements pertaining to the monitoring and reporting of such taking." The Act's implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for an authorization must include the suggested means of accomplishing the necessary monitoring and reporting that would result in increased

knowledge of the species and our expectations of the level of taking or impacts on populations of marine mammals present in the action area.

### Monitoring

The Observatory would conduct marine mammal monitoring during the present project, in order to implement the mitigation measures that require real-time monitoring, and to satisfy the monitoring requirements of the issued Authorization. We describe the Observatory's Monitoring Plan below this section. The Observatory has planned the monitoring work as a self-contained project independent of any other related monitoring projects that may be occurring simultaneously in the same regions. Further, the Observatory would discuss coordination of its monitoring program with any other related work by other groups working in the same area, if practical.

### Vessel-Based Passive Acoustic Monitoring

Passive acoustic monitoring would complement the visual mitigation monitoring program, when practicable. Visual monitoring typically is not effective during periods of poor visibility or at night, and even with good visibility, is unable to detect marine mammals when they are below the surface or beyond visual range. Passive acoustical monitoring can be used in conjunction with visual observations to improve detection, identification, and localization of cetaceans. The passive acoustic monitoring would serve to alert visual observers (if on duty) when vocalizing cetaceans are detected. It is only useful when marine mammals call, but it can be effective either by day or by night, and does not depend on good visibility. The acoustic observer would monitor the system in real time so that he/she can advise the visual observers if they acoustic detect cetaceans.

The passive acoustic monitoring system consists of hardware (i.e., hydrophones) and software. The “wet end” of the system consists of a towed hydrophone array that is connected to the vessel by a tow cable. The tow cable is 250 m (820.2 ft) long, and the hydrophones are fitted in the last 10 m (32.8 ft) of cable. A depth gauge is attached to the free end of the cable, and the cable is typically towed at depths less than 20 m (65.6 ft). The Langseth crew would deploy the array from a winch located on the back deck. A deck cable would connect the tow cable to the electronics unit in the main computer lab where the acoustic station, signal conditioning, and processing system would be located. The acoustic signals received by the hydrophones are amplified, digitized, and then processed by the Panguard software. The system can detect marine mammal vocalizations at frequencies up to 250 kHz.

One acoustic observer, an expert bioacoustician with primary responsibility for the passive acoustic monitoring system would be aboard the Langseth in addition to the four visual observers. The acoustic observer would monitor the towed hydrophones 24 hours per day during airgun operations and during most periods when the Langseth is underway while the airguns are not operating. However, passive acoustic monitoring may not be possible if damage occurs to both the primary and back-up hydrophone arrays during operations. The primary passive acoustic monitoring streamer on the Langseth is a digital hydrophone streamer. Should the digital streamer fail, back-up systems should include an analog spare streamer and a hull-mounted hydrophone.

One acoustic observer would monitor the acoustic detection system by listening to the signals from two channels via headphones and/or speakers and watching the real-time spectrographic display for frequency ranges produced by cetaceans. The observer

monitoring the acoustical data would be on shift for one to six hours at a time. The other observers would rotate as an acoustic observer, although the expert acoustician would be on passive acoustic monitoring duty more frequently.

When the acoustic observer detects a vocalization while visual observations are in progress, the acoustic observer on duty would contact the visual observer immediately, to alert him/her to the presence of cetaceans (if they have not already been seen), so that the vessel's crew can initiate a power down or shutdown, if required. The observer would enter the information regarding the call into a database. Data entry would include an acoustic encounter identification number, whether it was linked with a visual sighting, date, time when first and last heard and whenever any additional information was recorded, position and water depth when first detected, bearing if determinable, species or species group (e.g., unidentified dolphin, sperm whale), types and nature of sounds heard (e.g., clicks, continuous, sporadic, whistles, creaks, burst pulses, strength of signal, etc.), and any other notable information. The acoustic detection can also be recorded for further analysis.

#### Observer Data and Documentation

Observers would record data to estimate the numbers of marine mammals exposed to various received sound levels and to document apparent disturbance reactions or lack thereof. They would use the data to estimate numbers of animals potentially 'taken' by harassment (as defined in the MMPA). They would also provide information needed to order a power down or shut down of the airguns when a marine mammal is within or near the exclusion zone.

When an observer makes a sighting, they would record the following information:

1. Species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from seismic vessel, sighting cue, apparent reaction to the airguns or vessel (e.g., none, avoidance, approach, paralleling, etc.), and behavioral pace.
2. Time, location, heading, speed, activity of the vessel, sea state, visibility, and sun glare.

The observer would record the data listed under (2) at the start and end of each observation watch, and during a watch whenever there is a change in one or more of the variables.

Observers would record all observations and power downs or shutdowns in a standardized format and would enter data into an electronic database. The observers would verify the accuracy of the data entry by computerized data validity checks as the data are entered and by subsequent manual checking of the database. These procedures will allow the preparation of initial summaries of data during and shortly after the field program, and would facilitate transfer of the data to statistical, graphical, and other programs for further processing and archiving.

Results from the vessel-based observations would provide:

1. The basis for real-time mitigation (airgun power down or shutdown).
2. Information needed to estimate the number of marine mammals potentially taken by harassment, which the Observatory must report to the Office of Protected Resources.
3. Data on the occurrence, distribution, and activities of marine mammals and turtles in the area where the Observatory would conduct the seismic study.

4. Information to compare the distance and distribution of marine mammals and turtles relative to the source vessel at times with and without seismic activity.

5. Data on the behavior and movement patterns of marine mammals detected during non-active and active seismic operations.

### Reporting

The Observatory would submit a report to us and to the Foundation within 90 days after the end of the cruise. The report would describe the operations that were conducted and sightings of marine mammals and turtles near the operations. The report would provide full documentation of methods, results, and interpretation pertaining to all monitoring. The 90-day report would summarize the dates and locations of seismic operations, and all marine mammal sightings (dates, times, locations, activities, associated seismic survey activities). The report would also include estimates of the number and nature of exposures that could result in “takes” of marine mammals by harassment or in other ways.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner not permitted by the authorization (if issued), such as an injury, serious injury, or mortality (e.g., ship-strike, gear interaction, and/or entanglement), the Observatory shall immediately cease the specified activities and immediately report the incident to the Incidental Take Program Supervisor, Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to [Jolie.Harrison@noaa.gov](mailto:Jolie.Harrison@noaa.gov) and [ITP.Cody@noaa.gov](mailto:ITP.Cody@noaa.gov). The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;

- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

The Observatory shall not resume its activities until we are able to review the circumstances of the prohibited take. We shall work with the Observatory to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The Observatory may not resume their activities until notified by us via letter, email, or telephone.

In the event that the Observatory discovers an injured or dead marine mammal, and the lead visual observer determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as we describe in the next paragraph), the Observatory would immediately report the incident to the Incidental Take Program Supervisor, Permits and Conservation Division, Office of Protected Resources, at 301-427-8401 and/or by email to [Jolie.Harrison@noaa.gov](mailto:Jolie.Harrison@noaa.gov) and

[ITP.Cody@noaa.gov](mailto:ITP.Cody@noaa.gov). The report must include the same information identified in the paragraph above this section. Activities may continue while we review the circumstances of the incident. We would work with the Observatory to determine whether modifications in the activities are appropriate.

In the event that the Observatory discovers an injured or dead marine mammal, and the lead visual observer determines that the injury or death is not associated with or related to the authorized activities (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the Observatory would report the incident to the Incidental Take Program Supervisor, Permits and Conservation Division, Office of Protected Resources, at 301-427-8401 and/or by email to [Jolie.Harrison@noaa.gov](mailto:Jolie.Harrison@noaa.gov) and [ITP.Cody@noaa.gov](mailto:ITP.Cody@noaa.gov), within 24 hours of the discovery. The Observatory would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to us.

#### Estimated Take by Incidental Harassment

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

We anticipate and authorize take by Level B harassment only for the proposed seismic survey in the Atlantic Ocean. Acoustic stimuli (i.e., increased underwater sound) generated during the operation of the seismic airgun array may have the potential to result

in the behavioral disturbance of some marine mammals. There is no evidence that planned activities could result in injury, serious injury, or mortality within the specified geographic area for which we have issued the requested authorization. Take by injury, serious injury, or mortality is thus neither anticipated nor authorized. We have determined that the required mitigation and monitoring measures would minimize any potential risk for injury, serious injury, or mortality.

The following sections describe the Observatory's methods to estimate take by incidental harassment and present their estimates of the numbers of marine mammals that could be affected during the proposed seismic program. The estimates are based on a consideration of the number of marine mammals that could be harassed by seismic operations with the 36-airgun array during approximately 5,572 km<sup>2</sup> (2,151 mi<sup>2</sup>) of transect lines on the Mid-Atlantic Ridge in the Atlantic Ocean.

We assume that during simultaneous operations of the airgun array and the other sources, any marine mammals close enough to be affected by the echosounder and sub-bottom profiler would already be affected by the airguns. However, whether or not the airguns are operating simultaneously with the other sources, we expect that the marine mammals would exhibit no more than temporary and inconsequential responses to the echosounder and profiler given their characteristics (e.g., narrow downward-directed beam) and other considerations described previously. Based on the best available information, we do not consider that these reactions constitute a "take" (NMFS, 2001). Therefore, the Observatory did not provide any additional allowance for animals that could be affected by sound sources other than the airguns.

We have presented a more detailed discussion of the Observatory's methods to estimate take by incidental harassment in the notice of the proposed Authorization (78 FR 10137, February 13, 2013). Refer to the notice for more detailed information on the density data and their methodology to estimate take.

The Observatory's estimates of exposures to various sound levels assume that they will complete the surveys in full (i.e., approximately 20 days of seismic airgun operations); however, the ensonified areas calculated using the planned number of line-kilometers have been increased by 25 percent to accommodate lines that may need to be repeated, equipment testing, account for repeat exposure, etc. As is typical during offshore ship surveys, inclement weather and equipment malfunctions are likely to cause delays and may limit the number of useful line-kilometers of seismic operations that can be undertaken. Furthermore, any marine mammal sightings within or near the designated exclusion zone will result in the shutdown of seismic operations as a mitigation measure. Thus, the following estimates of the numbers of marine mammals potentially exposed to 160-dB re:1  $\mu$ Pa sounds are precautionary, and probably overestimate the actual numbers of marine mammals that might be involved. These estimates assume that there will be no weather, equipment, or mitigation delays, which is highly unlikely.

Table 2 in this notice shows estimates of the number of individual cetaceans that potentially could be exposed to greater than or equal to 160 dB re: 1  $\mu$ Pa during the seismic survey if no animals moved away from the survey vessel. We present the take authorization in the third column from the left in Table 2.

**Table 2** Estimates of the possible numbers of marine mammals exposed to sound levels greater than or equal to 160 dB re: 1  $\mu$ Pa during the proposed seismic survey over the Mid-Atlantic Ridge in the north Atlantic Ocean, during April through June, 2013.

Species	Estimated Number of Individuals Exposed to Sound Levels $\geq 160$ dB re: 1 $\mu$ Pa <sup>1</sup>	Requested or Adjusted Take Authorization <sup>2</sup>	Regional Population <sup>3</sup>	Approx. Percent of Regional Population <sup>3</sup>
<b>Mysticetes</b>				
Humpback whale	0	50	11,570	0.43
Minke whale	0	3 <sup>4</sup>	121,000	0
Bryde's whale	1	1	Not available	Not available
Sei whale	1	9	13,000	0.07
Fin whale	25	198	24,887	0.80
Blue whale	8	66	937	7.04
<b>Odontocetes</b>				
Sperm whale	21	164	13,190	1.24
Cuvier's beaked whale	0	7 <sup>4</sup>	3,513	0.2
<u>Mesoplodon spp.</u>	39	39	3,502	1.12
True's beaked whale				
Gervais beaked whale				
Sowerby's beaked whale				
Blainville's beaked whale				
Northern bottlenose whale	0	4 <sup>4</sup>	~40,000	0
Common bottlenose dolphin	47	47	81,588	0.06
Atlantic spotted dolphin	112	112	50,978	0.22
Striped dolphin	1,034	1,034	94,462	1.09
Short-beaked common dolphin	2,115	2,115	120,741	1.75
Risso's dolphin	21	21	20,479	0.10
False killer whale	7	7	Not available	Not available
Killer whale	0	5 <sup>4</sup>	Not available	0
Short-finned pilot whale	674	674	780,000	0.09

N/A = Not Available

<sup>1</sup> Estimates are based on densities in the Observatory's application an ensonified area of (5,571 km<sup>2</sup>; (2,151 mi<sup>2</sup>))

<sup>2</sup> Requested or adjusted take includes a 25 percent contingency for repeated exposures due to the overlap of parallel survey tracks or adjusted take for listed species based on the Section 7 consultation..

<sup>3</sup> Regional population size estimates are from the Observatory's application or based on the Section 7 consultation.

<sup>4</sup> Requested take authorization increased to group size for species for which densities were not calculated but for which there were OBIS sightings around the Azores.

The total estimate of the number of individual cetaceans that could be exposed to seismic sounds with received levels greater than or equal to 160 dB re: 1  $\mu$ Pa during the survey is 4,556 (see Table 2 in this notice). That total includes: 50 humpback whales (0.43 percent of the regional population); nine Sei whales (0.07 percent of the regional population); 25 fin whales (0.80 percent of the regional population); 66 blue whales (7.04 percent of the regional population); and 164 sperm whales (1.24 percent of the regional population) could be exposed during the survey. These species are listed as endangered under the ESA.

The Observatory did not estimate take of endangered north Atlantic right whale because of the low likelihood of encountering these species during the cruise. Most of the cetaceans that could be potentially exposed are delphinids (e.g., striped and short-beaked common dolphins are estimated to be the most common species in the area) with maximum estimates ranging from four to 2,115 species potentially exposed to levels greater than or equal to 160 dB re: 1  $\mu$ Pa.

#### Encouraging and Coordinating Research

The Observatory would coordinate the planned marine mammal monitoring program associated with the seismic survey on the Mid-Atlantic Ridge in the north Atlantic Ocean with other parties that may have interest in the area and/or may be conducting marine mammal studies in the same region during the seismic surveys.

#### Negligible Impact and Small Numbers Analysis and Determination

We have defined “negligible impact” in 50 CFR 216.103 as “...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably

likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.” In making a negligible impact determination, we consider:

- (1) The number of anticipated injuries, serious injuries, or mortalities;
- (2) The number, nature, and intensity, and duration of Level B harassment (all relatively limited); and
- (3) The context in which the takes occur (i.e., impacts to areas of significance, impacts to local populations, and cumulative impacts when taking into account successive/contemporaneous actions when added to baseline data);
- (4) The status of stock or species of marine mammals (i.e., depleted, not depleted, decreasing, increasing, stable, impact relative to the size of the population);
- (5) Impacts on habitat affecting rates of recruitment/survival; and
- (6) The effectiveness of monitoring and mitigation measures.

For reasons stated previously in this document, and in the notice of the proposed Authorization (78 FR 10137, February 13, 2013), the specified activities associated with the marine seismic surveys are not likely to cause permanent threshold shift, or other non-auditory injury, serious injury, or death. They include:

- (1) The likelihood that, given sufficient notice through relatively slow ship speed, we expect marine mammals to move away from a noise source that is annoying prior to its becoming potentially injurious;
- (2) The potential for temporary or permanent hearing impairment is relatively low and that we would likely avoid this impact through the incorporation of the required monitoring and mitigation measures (including power-downs and shutdowns); and

(3) The likelihood that marine mammal detection ability by trained visual observers is high at close proximity to the vessel.

We do not anticipate that any injuries, serious injuries, or mortalities would occur as a result of the Observatory's planned marine seismic surveys, and we do not propose to authorize injury, serious injury or mortality for this survey. We anticipate only behavioral disturbance to occur during the conduct of the survey activities.

Table 2 in this document outlines the number of requested Level B harassment takes that we anticipate as a result of these activities. Due to the nature, degree, and context of Level B (behavioral) harassment anticipated and described (see "Potential Effects on Marine Mammals" section in this notice), we do not expect the activity to impact rates of recruitment or survival for any affected species or stock.

Further, the seismic surveys would not take place in areas of significance for marine mammal feeding, resting, breeding, or calving and would not adversely impact marine mammal habitat.

Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (i.e., 24 hour cycle). Behavioral reactions to noise exposure (such as disruption of critical life functions, displacement, or avoidance of important habitat) are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall et al., 2007). While we anticipate that the seismic operations would occur on consecutive days, the estimated duration of the survey would last no more than 20 days. Additionally, the seismic survey would be increasing sound levels in the marine environment in a relatively small area surrounding the vessel (compared to the

range of the animals), which is constantly travelling over distances, and some animals may only be exposed to and harassed by sound for shorter less than day.

Of the 28 marine mammal species under our jurisdiction that are known to occur or likely to occur in the study area, six of these species are listed as endangered under the ESA, including: the blue, fin, humpback, north Atlantic right, sei, and sperm whales. These species are also categorized as depleted under the MMPA. With the exception of the north Atlantic right whale, the Observatory has requested authorized take for these listed species. The Observatory did not request take of endangered north Atlantic right whales because of the low likelihood of encountering these species during the cruise. We agree that the likelihood of co-occurrence of the north Atlantic right whales with the survey activities is extremely low and we have determined that the survey activities are likely to have no effect on this species. To protect these animals (and other marine mammals in the study area), the Observatory must cease or reduce airgun operations if animals enter designated zones.

As mentioned previously, we estimate that 28 species of marine mammals under our jurisdiction could be potentially affected by Level B harassment over the course of the proposed authorization. For each species, these take numbers are small (most estimates are less than or equal to seven percent) relative to the regional or overall population size and we have provided the regional population estimates for the marine mammal species that may be taken by Level B harassment in Table 2 in this document.

Our practice has been to apply the 160 dB re: 1  $\mu$ Pa received level threshold for underwater impulse sound levels to determine whether take by Level B harassment occurs. Southall et al. (2007) provides a severity scale for ranking observed behavioral

responses of both free-ranging marine mammals and laboratory subjects to various types of anthropogenic sound (see Table 4 in Southall et al. [2007]).

We have determined, provided that the Observatory implements the previously described mitigation and monitoring measures, that the impact of conducting a seismic survey on the Mid-Atlantic Ridge in the Atlantic Ocean in international waters, from April 2013 through June, 2013, may result, at worst, in a modification in behavior and/or low-level physiological effects (Level B harassment) of certain species of marine mammals. While these species may make behavioral modifications, including temporarily vacating the area during the operation of the airgun(s) to avoid the resultant acoustic disturbance, the availability of alternate areas within these areas and the short and sporadic duration of the research activities, have led us to determine that this action would have a negligible impact on the species in the specified geographic region.

Based on the analysis contained in this document, and in the notice of the proposed Authorization (78 FR 10137, February 13, 2013) of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the mitigation and monitoring measures, we find that the Observatory's planned research activities would result in the incidental take of small numbers of marine mammals, by Level B harassment only, and that the required measures mitigate impacts to affected species or stocks of marine mammals to the lowest level practicable.

#### Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses

Section 101(a)(5)(D) of the Marine Mammal Protection Act also requires us to determine that the authorization would not have an unmitigable adverse effect on the

availability of marine mammal species or stocks for subsistence use. There are no relevant subsistence uses of marine mammals in the study area (on the Mid-Atlantic Ridge in the north Atlantic Ocean in international waters) that implicate section 101(a)(5)(D) of the Marine Mammal Protection Act.

#### Endangered Species Act

Of the species of marine mammals that may occur in the proposed survey area, several are listed as endangered under the Endangered Species Act, including the blue, fin, humpback, north Atlantic right, sei, and sperm whales. The Observatory did not request take of endangered north Atlantic right whales because of the low likelihood of encountering these species during the cruise.

Under section 7 of the Act, the Foundation has initiated formal consultation with the Service's, Office of Protected Resources, Endangered Species Act Interagency Cooperation Division, on this proposed seismic survey. We (i.e., National Marine Fisheries Service, Office of Protected Resources, Permits and Conservation Division), have also consulted under section 7 of the Act with the Endangered Species Act Interagency Cooperation Division to obtain a Biological Opinion (Opinion) evaluating the effects of issuing an incidental harassment authorization for threatened and endangered marine mammals and, if appropriate, authorizing incidental take. These two consultations were consolidated and addressed in a single Biological Opinion addressing the direct and indirect effects of these interdependent actions.

In April 2013, the Endangered Species Act Interagency Cooperation Division issued an Opinion to us and the Foundation which concluded that the issuance of the Authorization and the conduct of the seismic survey were not likely to jeopardize the

continued existence of blue, fin, humpback, sei, and sperm whales. The Opinion also concluded that the issuance of the Authorization and the conduct of the seismic survey would not affect designated critical habitat for these species.

The Foundation and the Observatory must comply with the Relevant Terms and Conditions of the Incidental Take Statement corresponding to the Opinion issued to us, the Foundation, and the Observatory. The Observatory must also comply with the Authorization's mitigation and monitoring requirements –incorporated as Terms and Conditions in the Incidental Take Statement in order for take of listed species otherwise prohibited under Section 9 of the Act to be exempt.

#### National Environmental Policy Act (NEPA)

To meet our NEPA requirements for the issuance of an Authorization to the Observatory, we prepared an Environmental Assessment (EA) titled “Issuance of an Incidental Harassment Authorization to the Lamont-Doherty Earth Observatory to Take Marine Mammals by Harassment Incidental to a Marine Geophysical on the Mid-Atlantic Ridge in the north Atlantic Ocean, from April 2013 through June 2013.” This EA incorporated relevant portions of the Foundation's 2013 Environmental Analysis Pursuant To Executive Order 12114 (NSF, 2010) titled, “Marine geophysical survey by the R/V Marcus G. Langseth on the mid-Atlantic Ridge, April–May 2013,” and the Foundation's 2011 “Programmatic Environmental Impact Statement/Overseas Environmental Impact Statement for Marine Seismic Research Funded by the National Science Foundation or Conducted by the U.S. Geological Survey,” by reference pursuant to 40 CFR 1502.21 and NOAA Administrative Order (NAO) 216-6 § 5.09(d).

We provided relevant environmental information to the public through notice of the proposed Authorization (78 FR 10137, February 13, 2013) and considered public comments received in response prior to finalizing our EA and deciding whether or not to issue a Finding of No Significant Impact (FONSI).

We conclude that issuance of an Incidental Harassment Authorization would not significantly affect the quality of the human environment and have issued a FONSI. Because of this finding, it is not necessary to prepare an environmental impact statement for the issuance of an Authorization to the Observatory for this activity. Our EA and FONSI for this activity are available upon request (see ADDRESSES).

#### Authorization

We have issued an Incidental Harassment Authorization to the Observatory for the take of marine mammals incidental to conducting a marine seismic survey in the Atlantic Ocean, April to June, 2013, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: April 10, 2013

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Helen M. Golde,  
Acting Director,  
Office of Protected Resources,  
National Marine Fisheries Service.

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